AMENDMENTS TO THE CLAIMS:

The listing of claims will replace all prior versions, and listings of claims in the application:

LISTING OF THE CLAIMS

Claims 1-10 (Canceled)

11. (New) A method for optimizing the location of an in-mold coating injection port in a mold so as to minimize the flow time for an in-mold coating composition to flow over at least a part of a molded article, said method comprising the steps of:

predicting a coating composition fill pattern in said mold; and

using said pattern to determine optimal placement of a coating injection nozzle so as to minimize the flow time for an in-mold coating composition to flow over at least a part of a molded article and to reduce the presence of surface defects of a coating formed from said in-mold coating composition; and

placing said injection nozzle in said optimal placement position, wherein said step of predicting a coating composition fill pattern in said mold is performed by determining the relation between a pressure in said mold and a flow rate of said coating composition by using a finite difference method comprising the steps of:

a) defining a fixed spatial step to track a flow front location of the in mold coating composition,

b) advancing the flow front location by one spatial step for a fixed time increment,

c) obtaining the pressure and coating composition thickness distributions for said in mold coating, and

d) repeating said steps until the in mold coating composition filling process is complete.

12. (New) The method according to claim 11, wherein instructions for carrying out said method are contained in a computer readable medium format.

13. (New) The method according to claim 11, wherein said steps of predicting a fill pattern and determining optimal placement of said nozzle are performed by a computer.

14. (New) The method according to claim 13, wherein data necessary for performing said steps is input into said computer by a user.

15. (New) The method according to claim 13, wherein data necessary for performing said steps is automatically provided to said computer by an instrument taking digital scanning calorimetry measurements.

16. (New) The method according to claim 15, wherein said data is stored in a data collection means associated with said instrument and then relayed to said computer.

17. (New) The method according to claim 11, wherein said process minimizes the potential for surface defects in an in mold coating formed on a surface of said molded article.

18. (New) The method according to claim 11, wherein said method is used for an in-mold coating process including at least filling, packing, and solidification phases.

19. (New) The method according to claim 11, wherein said method is used in conjunction with a method to minimize a cure time of the in-mold coating composition.

20. (New) A method for optimizing the location of an in-mold coating injection port in a mold so as to minimize the flow time for an in-mold coating composition to flow over at least a part of a molded article, said method comprising the steps of:

predicting a coating composition fill pattern in said mold over at least a two dimensional surface; and

using said pattern to determine optimal placement of a coating injection nozzle so as to minimize the flow time for an in-mold coating composition to flow over at least a part of a molded article and to reduce the presence of surface defects

of a coating formed from said in-mold coating composition; and

placing said injection nozzle in said optimal placement position, wherein said step of predicting a coating fill pattern in said mold is performed by determining the following a) the relationship between a fluidity, S, of an in mold coating composition and a pressure gradient present in said mold, and b) the relationship between the coating thickness of the in mold coating composition and an injection pressure.

21. (New) The method according to claim 20, wherein a finite element method combined with a control volume approach can be used to numerically determine said relationships.

22. (New) The method according to claim 20, wherein instructions for carrying out said method are contained in a computer readable medium format.

23. (New) The method according to claim 20, wherein said steps of predicting a fill pattern and determining optimal placement of said nozzle are performed by a computer.

24. (New) The method according to claim 23, wherein data necessary for performing said steps is input into said computer by a user.

25. (New) The method according to claim 23, wherein data necessary for performing said steps is automatically provided to said computer by an instrument taking digital scanning calorimetry measurements.

26. (New) The method according to claim 25, wherein said data is stored in a data collection means associated with said instrument and then relayed to said computer.

27. (New) The method according to claim 20, wherein said process minimizes the potential for surface defects in an in mold coating formed on a surface of said molded article.

28. (New) The method according to claim 20, wherein said method is used

for an in-mold coating process including at least filling, packing, and solidification phases.

29. (New) The method according to claim 20, wherein said method is used in conjunction with a method to minimize a cure time of the in-mold coating composition.